

waved series of rounded ones; all these spots are margined with greyish. Body and legs more or less concolorous with wings.

Exp. wings 33 millim.

Hab. Penang (*Rev. L. Biggs, coll. Dist.*).

The peculiarity of this species is in its Ethiopian appearance, its most closely allied species being the West-African *L. larydas*, Cram.

XXVI.—*The Polyzoa of the Adriatic: a Supplement to Prof. Heller's 'Die Bryozoen des adriatischen Meeres,' 1867.* By the Rev. THOMAS HINCKS, B.A., F.R.S.

[Plates IX. & X.]

THE material on which the following papers are based has been placed in my hands by my friend Dr. Pieper, of Olfen, who has given much attention to both the Hydroïda* and the Polyzoa of the Adriatic. I propose to include in them a list of the Polyzoa which occur in Dr. Pieper's collection, but are not recorded by Heller in the above-mentioned work, with descriptions of new species and varieties, and critical notes on such as are imperfectly known.

Suborder CHEILOSTOMATA.

Family Æteidæ.

ÆTEA, Lamouroux.

Ætea recta, Hincks.

On stone, weed, &c.

Range. Bahusia; Southern Norway; Great Britain (south-west and west, to Shetland); Ireland (west coast); Naples (Waters).

Ætea truncata, Landsborough.

Abundant. The erect form attains a very luxuriant growth; the marked dwarf variety (*pygmæa*), which occurs on the British coasts, is also present in the Adriatic.

* We are indebted to him for a very valuable series of papers on the Hydroïda of the Adriatic, published in successive numbers of the 'Zoologischer Anzeiger' for 1884 (nos. 162–165 inclusive), which constitute a supplement to Heller's 'Die Zoophyten &c. des adriatischen Meeres' (1868).

Range. Bahusia; Southern Norway; Britain (chiefly south and west); Madeira.

Family Eucratiidæ, Hincks.

EUCRATEA, Lamouroux.

Eucratea chelata, Linnæus.

On other Polyzoa.

Range. Southern Norway; France (south-west); Bay of Cadiz; Great Britain and Ireland (generally distributed); Australia.

Family Notamiidæ, Hincks.

SYNNOTUM, nov. gen.

Der. σύν, together, and νῶτον, the back.

Gen. char.—*Zoarium* consisting of erect, slender, bifurcating shoots, which are attached by a mass of tubular fibres given off from the base of the primary cells. *Zoæcia* in pairs, joined back to back, each pair connected by tubular prolongations with the pair next but one below it *, elongate, expanding from the base upward (of the Eucratean type), the front occupied by a membranous area (aperture); sessile lateral avicularia and an articulated avicularium between the cells in each pair at the summit. *Oæcium* wanting.

This extremely interesting form has been already described and figured by Dr. Pieper †. He has referred it to the genus *Gemellaria*, an opinion in which, after an examination which proves to have been a very insufficient one, I fully concurred. At the same time Dr. Pieper notes the presence of avicularia and a peculiarity in the mode in which the pairs of cells are connected as points which might prove to be of generic value. He seems to have overlooked the fact (as I certainly did myself) that the structure of the zoarium is essentially the same as in *Notamia*, and that each pair of cells is united by tubular prolongations, not with the next in succession, but with the one below it, as in that genus. The zoæcia of the present form are of the Eucratean type and bear a close general resemblance to those of *Gemellaria*; they are also placed back to back as in that genus. Dr. Pieper is quite right in suggesting that *Synnotum* may perhaps be regarded “als Verbindungs-Glied zwischen *Gemellaria* und *Notamia*.”

* This clause is included in the family character.

† Jahresber. Westfal. Prov. Ver. vol. ix. pp. 43–48, Taf. ii.

It is undoubtedly a transition-form and one of the highest interest.

Avicularia are present under two forms—one placed laterally and in much the same position as the similar appendage in *Notamia bursaria*; the other, which is much more highly developed, occupies a central place at the summit of each pair of cells.

The lateral avicularium is perfectly sessile and is destitute of the stem, which gives to that of our "Shepherd's purse coralline" its striking resemblance to a tobacco-pipe.

In other respects the two seem to agree, so far as my specimens enable me to judge. In *Synnotum* the lateral appendage is only present on one of the cells in each pair, and occurs alternately on the right and left of the zoarium; it is placed immediately above the top of the cell on the inner side and close upon the double-stem, which embraces the pair of cells below it.

The second form of avicularium (the median) belongs to the articulated division and is a fully developed "bird's head." It is placed immediately above the pair of cells in the line of their junction, and seems to be attached to the tubular connexion by which the cells are linked together. It is borne on a tall and rather stout peduncular support and is of a globular shape (very slightly produced in front); the beak terminates in a short, somewhat curved, spike-like extremity. The peduncle on which the avicularium is borne is unlike the ordinary form, and at first sight suggests a doubt whether the appendage is movable (articulated) or merely pedunculate. I have met with a single case, however, in which it had been swung back and remained with the oral surface turned uppermost.

The association of articulated avicularia with lower forms in one and the same species is, I believe, a new fact. It is interesting to remember that in *Notamia* we find the fixed form of the appendage, which probably comes "on the whole nearest to the movable 'bird's head,'" and constitutes the most direct link between the two classes of avicularium." In the present member of the Notamian family this fixed form has been partially replaced by the higher, and the two developmental stages stand side by side in the same organism.

The differences between *Notamia* and *Synnotum* lie primarily in the structure of the zoecium and secondarily in the character and disposition of the avicularia.

The name which I have adopted (*Synnotum*) was suggested by Dr. Pieper as appropriate should his species prove to be entitled to generic rank.

Synnotum aviculare, Pieper.*Gemellaria avicularis*, Pieper, loc. cit.*Notamia avicularis*, Waters, "Supplemental List of Polyzoa from Bay of Naples," Journ. Roy. Microscop. Soc. ser. 2, vol. v. (1885).

Zoarium minute, slender, of delicate texture, glossy, simple in habit, consisting of long stems, which bifurcate at rather distant intervals. *Zoecia* in pairs, back to back, elongate, expanding gradually upwards from the base, which is much attenuated and tube-like, somewhat prominent above; the aperture occupying more than two thirds of the front, narrowing to a point below, the margin thin and unarmed; *lateral avicularia* small, sessile, placed at the top of a cell, on the inner side, adnate, developed alternately on the right and left of the zoarium, widening from the base upward, with a minute beak; *median avicularia* articulated, capitate, placed at the top of each pair of cells on the central line, subglobular, smooth, the beak very slightly produced, with a sharp spike-like extremity.

Hab. On the underside of stones, Nullipore, &c.

Range. Adriatic (Pieper); Bay of Naples (Waters).

In the present form the shoots originate in a pair of rudimentary zoecia, which are much shorter than the mature cells and are not prolonged below the aperture. They are destitute of avicularia, but give off from their lower extremity a number of long tubular fibres. From these primary zoecia a normal pair is developed, which immediately bifurcates, giving origin to two separate lines of cells. In the fork between the two branches is placed a capitate avicularium. After an interval bifurcation takes place again, but it is not carried further in any specimen which I have examined. Above each bifurcation there is only a single zoecium, as in *Notamia*, instead of the usual pair. Generally the course of development is the same in *Synnotum* as in *Notamia bursaria*; but in the latter the primary cells are borne on a stem which rises from a "rather stout creeping tube."

There seems to be little difference in general structure between the sessile and capitate avicularia, though they are very dissimilar in size and appearance. They agree in minute details and little change is needed to convert the one into the other. The stemmed avicularium of *Notamia*, and especially the larger form of it which occasionally occurs, marks a distinct advance towards the articulated form, and is intermediate between the two appendages of *Synnotum*.

A remarkable feature of the present species is the number of very long tubular fibres which are given off from all regions

of the zoarium. They originate from a small circular prominence, which is always either upon or in close proximity to the central stem. Two or three sometimes occur in connexion with a single pair of cells.

Family Chlidoniidæ.

CHLIDONIA, Savigny.

Chlidonia Cordieri, Audouin.

Thickly investing the stem of a seaweed.

Range. Australia; Cape York; the Canaries; Egypt; Tyre; Bay of Tunis; Nice; Naples; coast of Calvados.

Family Cellulariidæ.

SCRUPOCELLARIA, Van Beneden.

Scrupocellaria Bertholletii, Audouin.

(Pl. IX. figs. 1, 2.)

Scrupocellaria Bertholletii, Savigny, Egypt, pl. xi. fig. 3.

? *Scrupocellaria capreolus*, Heller, *op. cit.* p. II, pl. i. fig. 1.

Zoarium of rather delicate habit, white and glossy, dichotomously branched, forming small tufts. *Zoæcia* rather long, five in an internode, clavate, widest above and narrowing gradually downwards; aperture elongate-oval, with a thin margin, occupying about two thirds of the front; three spines on the outer margin above, on the inner a tall spine a little way down the side, and sometimes a small one above it; about halfway down the cell on the inner margin an antler-like scutum *, frequently wanting, often merely bifurcate and in its simplest condition acicular; *lateral avicularium* small, placed immediately behind the three outer spines; on the front of each cell just below the aperture a large sessile *avicularium*, tumid towards the base, the mandibular region facing towards the aperture; mandible acute, bent at the tip, directed outwards; beak of moderate size, not abruptly bent. *Vibracular cell* wedge-shaped, narrow and bluntly pointed below,

* Mr. Busk, following Smitt, has adopted the term *fornix* in place of *operculum*, which has been assigned by general consent to the oral valve. At the same time he plainly indicates his preference for *scutum* ('Challenger' Report, p. 15, footnote), and as in framing scientific terminology we are not bound by authority or precedent, but are free to select the terms which seem to be most fitting, I shall venture to side with Mr. Busk's evident preference against his practice and use the latter term, which seems to me indubitably the better, to designate the protective appendage with which the cell is furnished in this and other species.

expanding upwards ; aperture sloping inwards and extending almost across the cell, seta long and very slender. *Oœcium* simple, rounded above, somewhat contracted towards the orifice ; surface smooth and shining, punctured, the oral arch marginate.

There can be little doubt, I think, that this is the *Acamarachis Bertholletii* of Savigny's work, a species which has not yet been identified. Busk, in his Brit. Mus. Cat., placed it doubtfully amongst the synonyms of his *Scrupocellaria diadema* ; but in his 'Challenger' Report the latter is referred to *Crisia ciliata*, Audouin. There is a complete agreement between Savigny's figure and the species from the Adriatic, extending to the minuter details.

There is also, I think, the greatest probability that Heller's *Scrupocellaria capreolus* was founded on specimens of the present form, though both his diagnosis and figure are too slight to give us the information we require for a certain identification.

It is pretty evident that the bi- or trifurcate spine of his description is really the *scutum* ; this is sufficiently indicated by its position ; and if so there is a complete agreement in this element of structure between his species and *S. Bertholletii*. The characters of the aperture and the disposition of the spines in *S. capreolus* also point to the identity of the two forms. The spine on the inner margin a short distance above the scutum is especially characteristic. The lateral avicularium is small and an inconspicuous feature, as in *S. Bertholletii*. On the other hand, the oœcium of the latter is not mitriform, as that of *S. capreolus* is represented to be in the figure, but both are punctured ; the front avicularia are apparently wanting in Heller's species.

On the whole there seems to be ground for believing in the identity of the two forms. *S. Bertholletii* is common amongst the material which has come under my notice, and would probably not be overlooked by one who was investigating on the spot the fauna of the Adriatic. I have met with no other form which could have suggested Prof. Heller's description or figures.

There is a curious irregularity in the development of the scutum in the present species. Very often it is absent altogether or present only in very rudimentary condition on a few cells. Commonly it occurs as a bifurcate spine-like process, and only in rare instances, so far as my experience goes, does it present the appearance shown in the figure (Pl. IX. fig. 1). As Savigny's figures represent it as universally a mere bifurcate spine, the feeble development of this appendage

is probably characteristic of the species. In its earliest stage it is simply acicular.

The spines are variable in number, but the full normal equipment seems to be three on the outer and two on the inner margin.

The front avicularia are usually present and often of gigantic size, covering almost entirely the portion of the cell below the aperture. In some cases, however, they are quite insignificant; internodes occur occasionally on which all the appendages are reduced to mere pygmies. I have seen a considerable section of the stem, including several internodes, on which scarcely one was present and none strongly developed. It is quite possible therefore that they might escape the notice of an observer who had not the opportunity of examining a number of specimens.

Family Bicellariidæ.

BUGULA, Oken.

Bugula calathus, Norman.

This species occurs in the Adriatic and is at once recognized by its characteristic habit of growth and its light colour when dried, apart from the minute structural differences by which it is separated from *B. flabellata*.

Range. Britain (south-west) and Channel Islands.

Bugula ditrupæ, Busk. (Pl. IX. fig. 3, 4.)

The form which is represented in figure 4, Plate IX., is probably referable to this species, though it differs in some points from Busk's description. The cells can hardly be regarded as "fusiform;" they taper gradually and slightly downward, but are not contracted above. The spines, which are very constant in number and arrangement, do not correspond with those of *B. ditrupæ* as described. On the outer margin, which is somewhat folded in, are two spines, one of them suberect and pointing upwards, the other originating close to its base and curving slightly outwards. A similar pair is placed at the top of the inner margin. Immediately behind the outer pair on the top of the cell is a tall spine of much stouter build than the rest, whilst another, of more slender proportions, rises about halfway between the lateral groups. This is a very characteristic armature, and it is, as I have said, remarkably constant. Busk assigns four spines to his species, three on the outer and one on the inner margin;

but he may possibly have only examined cells furnished with the ovicell (in his figure every cell bears one), and in this case two of the spines would probably be covered. Looking to the general resemblance of the two forms, I have no hesitation in identifying them.

On some of the specimens from the Adriatic the *primary cell* is present (Pl. IX. fig. 3). The shoot commences with a simple stem of some length, which gradually widens upwards from the very slender base, and terminates above in a single cell. This cell is rudimentary, having an aperture which is very short as compared with that of the ordinary zoœcia, and surrounded by a number of tall spines, which originate outside the margin. The pair of opposed spines is also present on each side at the top. At the back of the primary cell two other zoœcia are developed which diverge and give origin to two branches. There is a slight peculiarity in these cells; an additional spine is present on the margin of the aperture between the bottom of it and the avicularium, but in all other respects they are normal. The specimens which I have seen are detached, so that nothing can be known of their habitat. Mr. Busk's are all on the shells of *Ditrupa*.

Range. Madeira.

Bugula gracilis, Busk.

Characteristic specimens occur on seaweed, but showing no trace of the curious appendages with which the variety *uncinata*, mihi, is furnished *. At the same time a careful examination of them leaves little doubt on my mind of the specific identity of *Bugula gracilis* and the form *uncinata*.

Range. Madeira (form *uncinata*) ; Britain ; North America.

Bugula plumosa, Pallas, form *aperta*, n.
(Pl. IX. fig. 6.)

Zoarium somewhat rigid in habit, branches rather long, fan-shaped, divided and subdivided dichotomously, disposed subspirally round the stem. *Zoœcia* biserial, alternate, elongate, narrowing slightly downward; aperture occupying fully three fourths of the front, rounded below, the outer margin more or less bent inward, carried out above into a strong subconical spine, and bearing a small *avicularium*, which is placed a short distance from the top. *Oœcium* extremely shallow,

* 'British Marine Polyzoa,' vol. i. p. 86.

entirely open in front, and scarcely sheltering the membranous sac enclosing the embryo, placed at the top of the cell and overhanging the orifice.

In most of the structural elements there is a complete resemblance between this form and the well-known *B. plumosa*. It is less flexible and graceful in habit than the "soft-feathered coralline," and the cells are perhaps flatter and less turned inwards than in that species; but these are trifling differences, and in the absence of the oœcium no one probably would hesitate to rank it under Pallas's name. The ovicells, however, of the two forms are essentially dissimilar: that of *B. plumosa* is subglobular and of the usual type; that of the present form is a mere shield slightly hollowed out and perfectly open in front (Pl. IX. figs. 6a, 6b). It resembles that of *B. purpurotincta*, but seems to be even more rudimentary. The difference is undoubtedly important, and in most cases would be accounted distinctive; but in view of the general structural agreement it seems better to rank the present form under *B. plumosa*.

Bugula spicata, n. sp. (Pl. IX. fig. 5.)

Zoarium simple and rather stiff in habit, about $\frac{3}{4}$ inch high. Shoots originating from a stem composed of a number of tubular fibres united together; branches tall, much divided and subdivided dichotomously, spreading. *Zoæcia* in from two to four series, elongate, straight above, of about the same width throughout (rectangular); aperture occupying nearly the whole front, narrowing downward, the lower extremity pointed, a strong spike-like spine on the outer margin above, and two, placed one in front of the other, on the inner. *Avicularium* on the outer margin, almost close to the top, well rounded behind, beak short, the extremity slightly bent. *Oœcium* terminal, rounded, smooth.

The zoæcia are generally biserial, but are often quadri-serial towards the upper part of the branches. I can only speak doubtfully of the size and habit of growth, as I have not seen more than one or two specimens, which might be immature, but the minute characters are sufficiently distinctive.

Bugula simplex, n. sp. (Pl. IX. fig. 7.)

Zoæcia in from two to five or six series, alternate, elongate, subrectangular, rather broad, very slightly contracted below, top of the cell straight; aperture extending almost to the bottom, broad as the cell above, narrowing slightly below,

margins thin, a little turned inwards, at the top on each side a short spinous projection. *Avicularium* placed a very short distance below the top, rather small, (as seen from above) very slender, elongate, straightish, running out to a fine point in front, the free extremity of the beak very short and slightly bent. *Oæcium* terminal, very wide (wider than the top of the cell), shallow, almost semicircular, marginate round the base, the front wall composed of slight membranaceous material.

B. simplex belongs to the same section of the genus as *B. flabellata*. The ovicell is extremely shallow, the basal portion slightly hollowed out and surrounded by a rim-like margin, and with a filmy membranous covering closing in the upper part of the front. It seems to be intermediate between the normal oœcium and the very rudimentary form which we have in *Bugula plumosa* form *aperta*. The zoarium, in the only specimen examined, is about half an inch in height; the branches which divide dichotomously and are somewhat flabellate originate together at the top of a short stem and form a cup-shaped growth.

DIACHORIS, Busk.

Diachoris hirtissima, Heller, form *cylindrica*, n.

Dr. Pieper's collection contains several specimens of an exceedingly interesting variety of this species. Two forms of the zoarium are known in this genus: one in which the cells are more or less decumbent and repent, not indeed adnate to the surface over which they spread, but attached to it by means of tubular fibres and adhesive disks; and another in which they are united so as to constitute erect, bilaminate fronds. To these must now be added a third, in which the zœcia are aggregated, so as to form *erect, cylindrical, branching stems* of considerable height, rooted by a mass of tubular fibres. These fibres, in the variety of the present species to which I have given the name *cylindrica*, pass upwards, erect and free, carrying lines of the interconnected cells in such a manner as to form cylindrical stems. The fibres occupy the hollow of the cylinder, and the cells, which lie closely together in line, constitute the walls. The shoots are somewhat loosely compacted and of lax habit, and towards the base the cylinder is sometimes imperfect. They grow in dense clusters and are much branched dichotomously, attaining a height of about two inches. The transformation which the species has undergone in this variety is really remarkable. It is a *Vincularia* amongst the Bicellariidæ, and may teach us the true

systematic value of such peculiarities of growth in a natural system.

Hab. On Nullipores.

Range. Cape Verd Islands : var. *robusta*, Hincks, Algiers.

Family Cellariidæ.

CELLARIA, Lamouroux.

Cellaria Johnsoni, Busk.

This seems to be a common species in the Mediterranean.

Range. Madeira ; Algiers ; Bay of Naples ; Shetland.

Family Membraniporidæ.

Subsection a. *Zoarium flexible and foliaceous.*

FLUSTRA, Linnaeus.

Flustra securifrons, Pallas.

This species is included in Heller's list, but he has not noted certain peculiarities which belong to the southern form of it. There are commonly two rather strong spines on the cell placed one on each side at the top, and the avicularia, in a large proportion of cases, are set obliquely *.

The front of the oœcia is closed in by a membranous curtain, and in those from which the embryo has escaped there is usually at the top of it in the centre an opening somewhat in the shape of a reversed triangle. The definiteness and uniformity in the position and form of this orifice seem to show that it is due to some special structural arrangement. It has all the appearance of having been caused by the action of a muscle attached to a point in the middle of the upper margin of the membrane, which, in contracting, has drawn a portion of it downward, and so provided for the egress of the embryo. A similar contrivance has been demonstrated in the ovicell of *Bicellaria ciliata*.

In *Flustra papyracea* an analogous opening exists.

Range. Britain (chiefly north) ; Norway ; Spitzbergen ; South Labrador ; Naples.

* These variations have been mentioned by Waters in his ' Bryozoa of the Bay of Naples.'

Subsection b. *Zoarium calcareous, adnate or erect.*

MEMBRANIPORA, De Blainville.

Membranipora operculata, n. sp. (Pl. IX. fig. 8.)

Zoæcia large, arranged with great regularity in quincunx, subclavate; aperture elongate-oval, occupying more than three-fourths of the front, wholly membranous; margin thin, unarmed, not granulated, the inner edge often set with minute conical projections; oral valve distinct, of a firm chitinous substance, edged with a white line, arched above, lower margin arcuate, slightly produced at each side into a point; the portion of the cell below the aperture smooth, bearing in the centre and close to the margin of the aperture a mound-like elevation, on the summit of which is a short sharply-pointed chitinous spine. *Oœcium* (?).

Hab. Incrusting seaweed.

The remarkable point in this handsome species is the structure of the oral valve. The small semicircular opening in the front wall of the cell, with its membranous lid, which is characteristic of the *Membraniporæ*, is here replaced by a comparatively solid and well-defined operculum, which remains unchanged in dried specimens when the membranous wall around it has completely shrivelled up. At the same time there is no solid framework isolating it from the surrounding wall, as in the genus *Euthyris*; it lies bedded in the membrano-gelatinous covering of the aperture, conspicuous from its well-defined light-coloured outline.

The oral structure in the present species may be regarded, from one point of view, as intermediate between that of the ordinary members of the genus and the more specialized form of it which is found in *Euthyris* amongst the *Flustræ* and *Thairopoa*, MacGillivray, amongst the *Membraniporæ*. But I have reason to believe, though I have not been able to determine the details with certainty, that the more highly organized operculum is in this case associated with peculiarities in the internal structure of the oœcium. I hope to be able to supply further particulars in a future paper.

Membranipora Dumerili, Audouin.

This species sometimes occurs with a much larger number of spines than have been noticed on British specimens.

There is commonly a tall slender spine at the bottom of the cell which bends inwards over the aperture; occasionally too there are several on the sides and as many as six at the top.

Range. Britain; Scandinavian seas; France (south-west); Bay of Naples.

Family **Cribrilinidæ.**

CRIBRILINA, Gray.

Cribrilina punctata, Hassall, var. (Pl. IX. fig. 9.)

A very pretty variety of this species is not uncommon. The centre of the front wall immediately under the projecting lower lip is occupied by a raised area, which is surrounded by a smooth border extending to the margin of the cell. The edge of this area is marked by a line of small prominences, and the outside wall occupied by a number of little alcoves hollowed out in the face of it. The field of the area is perforated. The pointed avicularia, one at each end of the thickened and mucronate lower margin and one on the summit of the ovicell, are present as in the more normal form.

May not this be the *Lepralia cribrosa* of Heller?

The specimens which have been sent me from the Mediterranean as Heller's species are undoubtedly referable to *C. punctata*.

Family **Myriozoidæ** (part.), Smitt.

SCHIZOPORELLA, Hincks.

Schizoporella unicornis, Johnston. (Pl. X. figs. 2, 3.)

Heller records this species and a number of varieties. One remarkable form, however, he does not seem to have noticed, which exhibits a very marked modification of the orifice and contrasts strongly with another form (also found in the Adriatic) in this and other points.

Schizoporella unicornis, form *longirostris*.

(Pl. X. fig. 2.)

Zoæcia large, often somewhat quadrate, moderately convex, surface reticulato-punctate, glossy; orifice arched above, lower margin straight, with a central sinus, contracted above (but without prominent points at the entrance), the cul-de-sac below round; peristome elevated and thickened, except in front, an umbo below the orifice. *Avicularium* on one side of the orifice, more or less raised, sometimes mounted on an elevated mound, with a very long beak, base triangular, above it very narrow and of about equal width throughout (narrowing

very slightly towards the point); mandible corresponding exactly with the fixed portion, much curved inwards towards the extremity. *Oæcium* prominent, rounded, ridges radiating from the centre towards the base, the furrows between them punctured.

This variety exhibits two striking peculiarities.

The first and most important is the conformation of the orifice, which will be best understood by comparing the cell of this form with that of another (Pl. X. fig. 3) which also occurs in the Adriatic and is probably the common one on the British coasts. The orifice of the latter is suborbicular above, with a broad and open sinus (occupying about half the lower margin or more), not constricted at the entrance, but widest there, and narrowing slightly downwards, though still broad and rounded at the bottom.

The second peculiarity of the present variety lies in the avicularium, which is of great length and much attenuated (Pl. X. figs. 2 and 2 a) above the broad triangular base. The slender mandible is much curved above. The area behind the mandible is semicircular and entirely closed in by membrane. The avicularium of the other form is short, suberect, with a triangular mandible slightly bent at the tip. The differences in the appendage are of less significance as it is more liable to modification, and intermediate forms frequently occur. But the variation in the orifice is certainly striking.

The *ansata* variety gives us something of an intermediate form; but I have met with nothing that makes a near approach to the present.

Schizoporella lineolifera, n. sp. (Pl. IX. fig. 10.)

Zoæcia disposed in radiating lines, small, ovate, depressed below, slightly elevated above; sutures well defined, a distinct raised boundary-line; surface thickly and regularly punctured, pores stellate; orifice suborbicular, narrowed and produced below, peristome not raised, immediately in front of it an umbo bearing on the top a small pointed *avicularium*, mandible directed straight outwards. *Oæcium* ample, broad and rounded above, contracted towards the orifice; surface punctured, the opening closed by the operculum; a raised line round the base.

At one time I was inclined to think that this might be the *Lepralia rufis* of Manzoni, a Pliocene species ('Briozoi Pliocenici Ital.' 1869); but there is hardly ground for the identification.

Schizoporella magnifica, n. sp. (Pl. X. fig. 1.)

Zoæcia quincuncial, large, ovate, rather depressed, sutures shallow; surface reticulate, no boundary-lines; orifice suborbicular, with a deep pointed sinus on the lower margin, wide at the entrance, tapering off to a point below, a small notch on each side just below the opercular denticles; peristome unarmed, not elevated; on each side of the orifice, close to the top of the cell, a pointed *avicularium*, erect, with a triangular mandible, slightly produced, a semicircular orifice at the base of the beak; at each side on the front of the cell, a little below the orifice, a similar avicularium, erect, borne on the inner surface of an elevated boss. *Oæcium* much elongated, ample and rounded above, tapering off towards the orifice, where it is much contracted, and ends in a subtubular opening which barely overhangs the top of the oral valve, surface reticulate.

Hab. Incrusting stones &c.

A splendid form, of which the remarkable ovicell is the great feature.

Schizoporella serratimargo, n. sp. (Pl. X. figs. 6.)

Zoarium erect, bilaminate, branched; branches wide, flat, compressed, extremities rounded. *Zoæcia* quincuncial; when young, distinct, ovate, moderately convex (sutures shallow), the oral region raised, surface dense, uneven, entire or with a few marginal punctures; orifice oval, with a small sinus on the lower margin, operculum thickened on each side, so as to give the appearance of a depression down the central line; peristome elevated and often much thickened, bearing four spines at the top; the older cells crowded, confused, highly calcified, primary orifice deeply depressed, a large secondary orifice somewhat produced in front, almost the whole front of the zoecium occupied by a large spreading elevation bearing a pointed avicularium. *Oæcium* rounded, subimmersed, closely united to the cells about it, with a smooth entire surface and a large cleft in front, wide at the opening and tapering upwards. Along the edge of the branches a line of gigantic avicularia with bluntly-pointed mandibles directed outwards.

I have not met with perfect specimens of this fine species, and am therefore unable to give the size or precise habit of growth. The broad flat branches are characteristic.

Schizoporella Pallasii, Heller (sp.). (Pl. X. figs. 7.)

Heller places this species in the genus *Eschara*. It bears a curious superficial resemblance to some of the forms which

are ranged under the *Adeonella* of Busk, a somewhat miscellaneous group which, as Waters has already suggested, must be dismembered. But it has no real affinity with the species which are related to *Adeona*, and which would properly belong to the genus *Adeonella* if that genus is to be maintained. It seems to me to be a *Schizoporella*, the characters of which are somewhat masked by the curious bridge-like structure which crosses the cell immediately below the orifice. This materially affects the appearance of the species, but does not seem to have any special significance. It is due to the union of the risings on which the two lateral avicularia are placed, a little below the orifice; they grow together and form an arch across the front of the elevated peristome, leaving an opening below, through which the primary orifice and the sinus are visible.

The same structure is met with in *Schizoporella biturrita*, mihi, on which Busk has founded his genus *Gephyrophora*, with the specific name *polymorpha* ('Challenger,' Report). In this case the "bridge," it would seem, is almost as often absent as present. The specimens on which my description was founded were entirely destitute of it, and I have met with others in the same condition. The structure does not appear to be a very essential one. Apart from this peculiarity, *S. biturrita* is a very typical member of the genus to which I refer it, and it certainly seems to be too trivial to stand as the sole distinctive character of a generic group. The orifice of *S. Pallasii* is arched above, with a straight lower margin and a central sinus of moderate size. Waters (who identifies this species with the *Eschara polystomella* of Reuss) ranks it under *Adeonella*, an opinion in which I cannot concur.

Range. Bay of Naples.

Schizoporella atrofusca, Busk. (Pl. X. figs. 4, 5.)

This species is identified by Waters ('Polyzoa of Bay of Naples') with *Lepralia cucullata*, Busk (Brit. Mus. Cat.). But if the description and figure of the latter are to be trusted the two must be distinct. It is altogether destitute of the large and very marked sinus, with the strong denticular projections at the entrance, which are so characteristic of the present form. In point of fact the latter is *Lepralia atrofusca*, Busk, described in the Quart. Journal of Microscopical Science, vol. iv. 1856, p. 178, but without figure. The description though brief is sufficiently characteristic, and leaves no doubt as to the form intended. The variety with the thickened and elevated peristome in front (Pl. X. fig. 5), which may be distinguished as form *labiosa*, has smaller

cells than normal Mediterranean and Mazatlan specimens, and is much altered in appearance by the modification of the mouth, but is essentially identical with the present form.

The cells of this species are commonly covered with an epidermis, which partially conceals the punctures. Two small round prominences are present on the operculum just within the sinus.

Range. Bay of Naples; Mazatlan: form *labiosa*, Arabian sea.

Schizoporella auriculata, Hassall. (Pl. X. figs. 8.)

A form which has hitherto been referred to this common species, and which is distinguished by its large spatulate avicularia, occurs abundantly amongst the dredgings from the Adriatic. The peculiar avicularium is associated with a very distinctive form of orifice (Pl. X. fig. 8 a). The ordinary cell of *S. auriculata* is represented in fig. 8, Pl. X., and a comparison of the two will show the marked differences between them. The general shape of the orifice and the character of the sinus are quite dissimilar. The form *spathulata* seems always to bear the spatulate avicularium, or an *elongate oval* avicularium, which is the earlier stage of the former. In this stage the beak has a trifoliate form (Pl. X. fig. 8 b), with a small central projection on the inferior margin. The avicularium of the normal form is, I believe, always circular and very small. It may, I think, be doubtful whether the variety is not entitled to specific rank. It seems to be a southern form, occurring in Britain on the south-west coasts, in the Adriatic, and the Bay of Naples. The point will be left for further investigation.

EXPLANATION OF THE PLATES.

PLATE IX.

- Fig. 1. Scrupocellaria Bertholletii*, Audouin.
- Fig. 2. Ditto.* Dorsal surface.
- Fig. 3. Bugula ditrupæ*, Busk. Showing the primary cell.
- Fig. 4. Ditto.*
- Fig. 5. Bugula spicata*, n. sp. 5 a. Ovicells. 5 b. Avicularium.
- Fig. 6. Bugula plumosa*, Pallas, form *aperta*, n. 6 a. Side view of the ovicell. 6 b. Cell and ovicell, front view.
- Fig. 7. Bugula simplex*, n. sp.
- Fig. 8. Membranipora operculata*, n. sp.
- Fig. 9. Cribrilina punctata*, var.
- Fig. 10. Schizoporella lineolifera*, n. sp. 10 a. Orifice.

PLATE X.

- Fig. 1. Schizoporella magnifica*, n. sp.
- Fig. 2. Schizoporella unicornis*, Johnston, form *longirostris*. 2 a. Avicularium.

- Fig. 3. Schizoporella unicornis*, Johnston. Normal.
Fig. 4. Schizoporella atrofusca, Busk.
Fig. 5. Schizoporella atrofusca, form *labiosa*.
Fig. 6. Schizoporella serratimargo, n. sp. Marginal cells. 6 a. Mature cells and ovicell. 6 b. Marginal avicularium. 6 c. Oral valve. 6 d. Nat. size.
Fig. 7. Schizoporella Pallasii, Heller. 7 a. Marginal cell, showing sinus.
Fig. 8. Schizoporella auriculata, Hassall. Showing ordinary form of orifice. 8 a. Variety *spathulata*. 8 b. Avicularium of this variety in early stage.

XXVII.—*Hystricrinus, Hinde, versus Arthroacantha, Williams: a Question of Nomenclature.* By GEORGE JENNINGS HINDE, Ph.D., F.G.S.

IN the 'Annals' for March 1885, p. 158, I proposed the term *Hystricrinus* for a genus of Crinoids with movable spines in place of *Arthroacantha*, Williams *, on the ground of the resemblance of this latter term to *Arthracanthus*, Schmarda †, which had been previously employed for a genus of Rotatoria. The essential similarity of these terms seemed to me to bring the case so very clearly within the tenth rule of the British Association Committee ‡, that "a name should be changed when previously applied to another group which still retains it," that it did not seem necessary to advance any arguments to justify the course adopted. But Messrs. Wachsmuth and Springer, in part iii. of their lately issued "Revision of the Palaeocrinoidea" §, p. 116, reject my term *Hystricrinus* and reinstate Williams's name, on the ground that "*Arthroacantha* is a different word from *Arthracanthus* although of the same etymology and of similar construction, and there are other names of recognized standing in natural history which bear a closer resemblance to prior names than this" (p. 117).

As the question is of more than the mere personal interest as to who should be the author of a generic name, and as it should be decided in accordance with the rules made to prevent confusion in scientific literature, and with the general practice of reputable scientific authors of the present day, I venture to state the reasons which appeared to me to be sufficient not only to justify, but to necessitate, the substitution of another term for that of Professor Williams. I may first premise that the remarks which may be made upon the invalidity of Prof. Williams's name are not intended in any

* 'Proceedings of the American Philosophical Society,' 1883, p. 84.

† Denkschr. k.-k. Akad. d. Wiss. Wien, vol. vii. 1854, p. 12.

‡ 'Report of the Thirty-fifth Meeting of the British Association for the Advancement of Science,' Birmingham, 1865, p. 33.

§ 'Proceedings of the Academy of Natural Sciences, Philadelphia,' July 1885, p. 116 (separate copy).